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ABSTRACT

These four papers are from a symposium on instructional strategies that was facilitated by Joseph Kessels at the 1995 Academy of Human Resource Development (HRD) conference. "Developing Supervisory Expertise: The Effects of an Inductive versus a Deductive Training Method on the Job Behaviors of Supervisors" (Margaret C. Lohman) discusses a study that showed that, although supervisors in a group trained with deductive methods demonstrated a greater ability to apply their learning, supervisors trained inductively perceived that the quality of their training experience was better; implications of these findings for HRD theory, research, and practice are presented. "Identifying Instructional Criteria in Corporate Settings" (Clark J. Hickman) reports on a factor analysis study of a national sample of 372 trainers who reported the criteria they employ when deciding to adopt or reject a proposed new instructional method. "Exploring the Use of Training Games" (James J. Kirk, Hal Shoemaker) explores differences in the use of games by trainers in 82 companies. Trainers who spent a large percentage of their training time on gaming activities used games to generate ideas or solutions, whereas trainers using games less tended to use them to introduce new concepts. "Structured On-the-Job Training: Domain and Factors" (Jong Cheul Yang) critiques previous definitions of structured on-the-job training and suggests a model for the process. (KC)

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Developing Supervisory Expertise: The Effect of An Inductive Versus Deductive Training Method on the Job Behaviors of Supervisors
Margaret C. Lohman, University of Iowa

Identifying Instructional Criteria in Corporate Settings
Clark J. Hickman, University of Missouri- St. Louis

Exploring the Use of Training Games
James J. Kirk, Western Carolina University
Harold L. Shoemaker, University of Tennessee

Structured On-The-Job Training: Domains and Factors
Jong Cheul Yang, University of Minnesota

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Developing Supervisory Expertise: The Effects of an Inductive Versus a Deductive Training Method on the Job Behaviors of Supervisors

Margaret C. Lohman
University of Iowa

This study investigated the effects of an inductive versus a deductive training method on the learning outcomes and job behaviors of supervisors. The findings showed that while supervisors in the deductive group demonstrated greater ability to apply their learning, supervisors in the inductive group perceived that the quality of their training experience was better. Implications of these findings for HRD theory, research, and practice are discussed.

Job expectations for supervisors have been changing in recent years. In the past, supervisors were expected to use a directive approach to supervise their employees (Bittel, 1987). With this type of approach, supervisors directed the work of subordinates by controlling their behaviors and actions (Bienvenu, 1976). In general, this method of supervision was consistent with the goals of most organizations, which were oriented toward high production and efficiency. However, during recent years many organizations have responded to the demands of a new economy by shifting their goal orientations from production and efficiency to quality and customer responsiveness. An outcome of these shifting goal orientations has been a growing recognition that employee knowledge and skills are critical to the effectiveness of organizations (Kirkpatrick, 1993). As a result, a directive supervisory approach, which tends to control employee behavior rather than develop employee capacity, has become increasingly less effective as a means of managing work (Bramlette, 1984; Wolfe, 1983).

Presently, organizations expect supervisors to facilitate the work of their employees (Bittel, 1987). In contrast to a directive approach, a facilitative supervisory approach involves fostering a work environment that values the development of job expertise, knowledge-seeking ability, and learning skills. According to Wolfe (1983) and Bramlette (1984), a prime advantage of a facilitative supervisory approach is that it fosters a work environment which better accommodates the new and dynamic nature of work and the changing nature of those who do the work.

Present supervisory job expectations have focused greater attention on how supervisors are developed, especially as the development involves formal training programs (Bittel, 1987; Gardner, 1980). Many organizations provide HRD programs for preparing supervisors. Previous research suggests that outcomes of these programs are determined by both the content of the instruction and the methods used to deliver the content (Burke & Day, 1986). The appropriateness of the training method may be especially important given that supervisory training programs are presently emphasizing more problem solving, critical thinking, and learning skills.

Traditionally, supervisory training programs have used deductive training methods. These methods are characterized by off-site training sessions in which instructor-led presentations of content are followed-up by group discussions and small-group activities (Holland, Holyoak, Nisbett, & Thagard, 1986). A review of the related literature in HRD, educational psychology, and cognitive psychology suggests that there are three primary concerns regarding the use of deductive methods for supervisory training. First, training methods which are more deductive in nature may not necessarily be aligned with actual supervisory job expectations. Although deductive methods are commonly associated with knowledge and skill acquisition and, to a somewhat lesser degree, retention and transfer, one of their limitations is that they do not necessarily require the use of, or result in the development of, higher-level cognitive skills (Newbert & Binko, 1992). This situation is concerning since present job expectations require that supervisors possess greater problem-solving, critical-thinking, and learning skills.

A second concern with the use of deductive methods for supervisory training is that the development of and ability to use complex cognitive skills may be diminished because of the location where training typically occurs (Gardner, 1987). Supervisory training which utilizes deductive methods often takes place away from the job site. As a result, trainees are removed from the influence of people and environments that provide rich opportunities for acquiring, transferring, and applying information.

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A third concern is that the use of deductive methods for supervisory training may not account for the relationship between training method and training content. Studies have found that certain training methods are more suited for particular content areas (Burke & Day, 1986; Carroll, Paine & Ivancevich, 1972). Yet, supervisory training programs seem to rely on the continual use of deductive methods without considering whether other types of training methods may be better suited for specific content areas.

In contrast to a deductive method of training, guided discovery is an inductive method that appears to be more consistent with present supervisory job expectations. Featuring a more inductive sequence of instructional events, guided discovery involves trainees in three main learning tasks: (a) gathering, organizing, and categorizing information; (b) identifying critical relationships among information and making inferences based on those relationships; and (c) testing inferences by applying them to new situations (Joyce & Weil, 1986; Newbert & Binko, 1992; Taba, 1966). Previous research has shown that inductive methods are more effective in developing higher-level cognitive skills, all the while accomplishing the same short-term training outcomes as deductive methods (Newbert & Binko, 1992; Vazquez-Abad & Winer, 1992). However, these studies have been primarily conducted in academic and laboratory settings with children and college students. Therefore, while an inductive method appears to be more aligned with present supervisory job expectations, the theoretical proposition that it effects the simultaneous development of technical knowledge and cognitive skill has not been empirically examined with adults involved in training activities.

Purpose of the Study

The purpose of this study was to determine the effects of a guided discovery versus a deductive training method on the learning outcomes and job behaviors of supervisors. As illustrated in Figure 1, it was proposed that if a training method can affect learning outcomes and job behaviors, then it is likely that trainees receiving the same training content will demonstrate different learning outcomes and job behaviors, because of the training method used to deliver the content.

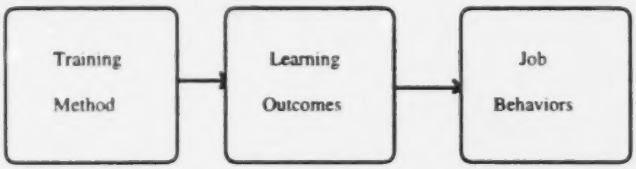

Figure 1. Theoretical Model of the Relationship Between Training Method, Learning Outcomes, and Job Behaviors

Hypotheses

This study investigated the effects of a guided discovery versus a deductive training method on supervisors' acquisition of learning, application of learning, self-reported problem-solving skill, and facilitation of subordinate problem-solving skill. Specifically, four hypotheses were tested:

Acquisition of Learning. Supervisors experiencing the guided discovery method will acquire greater mastery of the concept taught during training than those experiencing the deductive method.

Application of Learning. Supervisors experiencing the guided discovery method will demonstrate greater ability to apply the concept taught during training to a job task than those experiencing the deductive method.

Self-Reported Problem-Solving Skill. Supervisors experiencing the guided discovery method will demonstrate greater levels of problem-solving skill when handling a challenging job task than those experiencing the deductive method.

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Facilitation of Subordinate Problem-Solving Skill. Subordinates of supervisors experiencing the guided discovery method will report that their supervisors expected them to demonstrate greater levels of problem-solving skill when learning the concept taught during training than will the subordinates of supervisors experiencing the deductive method.

Methods

In the following paragraphs the subjects, research design, outcome measures, rating instruments, and data analysis plan that were used in the study are discussed.

Subjects. This study was conducted during the first week of March, 1994. The experimental treatment was administered in an existing supervisory training program offered by the HRD department of a large financial services organization. This company is located in the mid-west region of the United States and is large in size, employing 15,526 people at the time of the study. Supervisors represent 5.9 percent of this company's total employee population.

Although 19 supervisors originally enrolled in the supervisory training program, 3 did not attend two mandatory training sessions and were considered drop-outs of the study. The remaining 16 supervisors served as the subjects in the study.

Of these 16 supervisors, 10 were female and 6 were male. The subjects was fairly young and well educated. The mean age was 33.5 years and 12 supervisors had attained a college degree or higher. In addition, the majority of the subjects (n = 10) were new supervisors with less than 18 months of supervisory experience. The supervisors were also fairly new to the organization with 9 subjects having less than 5 years of service with the company, 5 subjects having 5 to 15 years of service, and the remaining having more than 15 years of service. The supervisors worked in a variety of functional areas with 5 supervising a production-oriented area, 5 supervising an accounting/clerical area, 3 supervising a sales/marketing area, and 3 supervising an engineering/technical area.

Research Design. This was an experimental type of study utilizing the post-test only control group design for the main independent variable (Campbell & Stanley, 1963). Subjects were randomly assigned to either a guided discovery or a deductive group for 1 of 11 instructional units in the training program. After the training was delivered, post-test measures were taken immediately following training and three weeks after training. This design was chosen because it enabled the researcher to compare the guided discovery and the deductive method in terms of their effects on the selected dependent variables. Furthermore, randomization assured that the groups were equal on any confounding variables that might be related to the dependent variables, thus assuring that differences observed in the dependent variables could be attributed to the treatment rather than to other causes (Kerlinger, 1964).

The guided discovery and deductive versions of the instructional unit were designed by the researcher. The content of the instructional unit, the constructive feedback process, was derived from an existing instructional unit used by the participating organization. A subject matter expert in the participating organization validated the content of both versions of the unit. In addition, two instructional design experts at The Ohio State University validated the guided discovery and the deductive methods used in the different versions of the unit.

Two experienced trainers employed by the HRD staff of the participating organization delivered the training. Separate two-hour training sessions were held for each of these trainers. The training objectives, method, activities, and evaluation methods that trainers were expected to use when delivering the training were discussed during these sessions.

The trainers delivered the training during two off-site sessions, which were held seven days apart. Although the total amount of instructional time was constant for both groups (4 hours), the format of the sessions varied with the method of training. For the guided discovery group, the first session lasted one hour and included discussion of the training topic, the learning objectives, and the on-the-job training (OJT) activity. For the OJT activity, supervisors identified people in the workplace who possessed expertise in giving constructive feedback and then met with these individuals to collect information about the constructive feedback process. Trainees were asked to complete this activity before the second training session. The second training session lasted three hours during which time supervisors engaged in three inductive learning activities. First, in small groups supervisors shared and categorized information that they had collected during their OJT activity. Next, in a large group they explored relationships within and between their

categories of information and used their resulting knowledge to make inferences about the critical steps in the constructive feedback process. Lastly, supervisors tested and revised their inferences by analyzing video-taped and live role-plays of constructive feedback situations.

In contrast to the guided discovery group, the first training session for the deductive group lasted three hours. During this session, the trainer presented the topic, objectives, content of training, and instructions for an OJT activity. Supervisors then practiced applying the content by critiquing video-taped and live role-plays of the constructive feedback process. At the end of this session, supervisors were assigned an OJT activity to be completed before the second training session. This activity involved practicing the constructive feedback process in a real job situation. The second training session lasted one hour and included a large group review of the constructive feedback process and a discussion of the results of the OJT activity.

Outcome Measures. Four dependent variables assessed the effects of training. Acquisition of learning was classified as a learning outcome and was measured immediately after training. Application of learning, self-reported problem-solving skill, and facilitation of subordinate problem-solving skill were classified as job behaviors and were measured three weeks after training. Each dependent variable was measured by using a rating instrument to evaluate written examples of the criterion. According to research and design experts, for example Kerlinger (1964), rating scales are an appropriate technique for quantitatively analyzing the content of written responses.

Acquisition of learning was measured by evaluating written examples of hypothetical constructive feedback scenarios generated by supervisors. These examples were evaluated in terms of the degree to which they demonstrated six key steps of the constructive feedback process.

Application of learning was measured by evaluating written responses of supervisors in which they described how they had recently used constructive feedback in a job situation. These responses were evaluated in terms of each supervisor's application of six key steps of the constructive feedback process to a job situation.

Self-reported problem-solving skill was measured by evaluating the level of problem-solving skill that was evident in written responses of supervisors in which they described their mental thoughts about how they identified and solved a problem and the physical actions that they used to handle the problem. These responses were evaluated in terms of the degree to which supervisors gathered information about a problem situation, interpreted the meaning of the information in relation to the problem situation, and applied those interpretations to the situation to test their validity and usability.

Facilitation of subordinate problem-solving skill was measured by evaluating the level of problem-solving skill that supervisors expected their subordinates to demonstrate when engaging in a challenging task. The job task that was used as a referent was learning about constructive feedback. At the end of the second training session, supervisors were instructed to pass on the meaning of constructive feedback to their subordinates using any methods that they deemed appropriate. Three weeks later, a sampling of each supervisor's subordinates reported how their supervisor had expected them to learn about constructive feedback. These responses were then evaluated in terms of the degree to which subordinates were expected to gather information about the constructive feedback process, infer from this information the key steps of the constructive feedback process, and apply those inferences to test their validity and usability.

Rating Instruments. Two rating instruments were developed by the researcher to measure the dependent variables. The Concept Learning Rating Scale (CLRS) was designed to measure acquisition and application of learning. This instrument consisted of 6 items, which represented the key steps of the constructive feedback process as identified in the instructional unit. A weight for each of the six items was established by a panel of constructive feedback experts. A 4-point scale ranging from 1 (poor) to 4 (excellent) was used to measure the quality with which a response demonstrated each of the six steps. Scores for a response were obtained by assigning a rating for each of the six items, multiplying each rating by its assigned weight, and summing the weighted scores. Total scores were reported as interval data with a range of 1 to 4.

The Problem Solving Rating Scale (PSRS) was designed to measure the two problem-solving skill variables. The instrument used a 4-point scale ranging from 0 (not evident) to 3 (much evidence) to evaluate the level of evidence that was present in a response for each of nine problem-solving activities. A total score was obtained by summing the ratings assigned to each of the nine items. Total scores were reported as interval data with a range of 0 to 27.

The validity of both instruments was established. First, a panel of subject matter, population, and research experts established the face and content validity of the instruments. Next, two field tests, comprised of supervisors who had previously taken the supervisory training program in which the study was being conducted, confirmed the face and content validity of both instruments and established their suitability for supervisors in this particular organization.

After validity was established, a pilot test was used to assess the reliability of the instruments. Supervisors attending a supervisory orientation program in February, 1994 served as the pilot group (N = 10). Participants generated two written responses for the pilot test; in the first response they described how they had recently given constructive feedback to an employee and in the second they described how they had recently handled a challenging job situation. Four trained raters then used the CLRS and the PSRS, respectively, to evaluate the responses. Test-retest reliability, interrater reliability, and an internal measure of consistency were assessed for each instrument. As shown in Table 1, reliability coefficients were very high ranging from .78 to .93.

Table 1. Reliability Coefficients for the CLRS and PSRS

	Measure of Reliability		
Instrument	Test-Retest	Interrater	Internal Consistency
CLRS	.84	.93	.83
PSRS	.83	.78	.79

Data Analysis. A three-stage plan was used to analyze the data. First, a correlational analysis was conducted to determine if any of nine attribute variables may have influenced the results of the study. An attribute variable was to be used as a covariate in an analysis of covariance if it was found to be at least moderately correlated ($r > .35$) to both the method of training and any of the dependent variables (Fraenkel & Wallen, 1990). None of the nine attribute variables met those conditions. The second stage of data analysis involved testing the four hypotheses. Since no covariates were found, t-tests were used as the statistic for these tests. The last stage of data analysis involved analyzing the attitudes of trainees toward the training experience.

Results

Ratings of responses generated by 16 supervisors and a sampling of each supervisor's subordinates provided the data for testing the hypotheses. Table 2 presents the mean scores, standard deviations, and t values for each of the four dependent variables.

A significant difference was found for one of the four hypotheses. At an alpha level of .10, no significant difference was found between the mean scores of the two instructional groups for acquisition of learning, self-reported problem-solving skill, or facilitation of subordinate problem-solving skill. However, a significant difference ($p = .027$) was found for application of learning with the deductive group demonstrating greater ability to apply the constructive feedback process than the guided discovery group.

In addition to the results for the four hypotheses, an attitude survey was used to gather information about trainees' attitudes toward the training experience. The survey consisted of two sections. The first section assessed participants' attitudes toward the clarity of the training objectives, the consistency of the training content and the objectives, the relevancy of the content to their jobs, the usefulness of the training materials, and the expected ability to use the knowledge/skill gained from the training experience in their jobs. A 5-point scale ranging from strongly disagree (1) to strongly agree (5) was used to measure these items. The second section assessed participants' attitudes toward the quality of four training activities in the training program and the overall training experience. A 5-point scale ranging from poor (1) to excellent (5) was used to measure these items.

T-tests revealed no significant differences between the attitudes of the subjects in the two groups on any of the items in the first section. However, data revealed that there were significant differences between the two groups regarding their attitudes toward the quality of the training activities and the overall training experience. As shown in Table 3, supervisors in the guided discovery group rated the quality of three of the four training activities and the overall training experience significantly higher than participants in the deductive group.

Table 2. Means, Standard Deviations, and T Values for the Instructional Groups on Selected Dependent Variables

	Guided Discovery[a]		Deductive[a]		
Dependent Variables	Mean	SD	Mean	SD	t
Acquisition of learning	2.71	.82	3.31	.61	1.67
Application of learning	1.82	.52	2.55	.66	2.46*
Self-reported problem-solving skill	13.60	6.14	16.60	5.76	1.01
Facilitation of subordinate problem-solving skill	2.50	3.70	1.90	2.70	- .39

[a] $n = 8$ for each group
*$p < .10$

Table 3. Attitudes of Supervisors Toward Four Training Activities and the Overall Training Experience

	Guided Discovery[a]		Deductive[a]		
Training Activities	Mean	SD	Mean	SD	t
Large group discussion	3.6	.52	3.0	.76	-1.93*
Small group activity	3.6	.74	3.5	.93	-0.30
Role-play activity	3.6	.52	3.0	.76	-1.93*
On-the-job activity	3.6	.75	2.9	.84	-1.90*
Overall training experience	3.9	.64	3.1	.35	-2.90*

[a] $n = 8$ for each group.
*$p < .10$

Discussion

Theory in educational and cognitive psychology postulates that inductive methods effect the concurrent development of technical knowledge and cognitive skill. This study investigated whether this proposition applies to adults engaged in training activities. The findings revealed that while the two methods of training did not differentially impact acquisition of learning or problem-solving behaviors, they did differentially influence trainees' ability to apply their learning and their attitudes toward the training experience.

The findings for acquisition of learning appear consistent with previous research and theory. Training experts believe that training objectives can be achieved through the use of either

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a deductive method of training (Goldstein & Sorcher, 1974; Kirkpatrick, 1993) or a guided discovery method of training (Newbert & Binko, 1992), if the methods are utilized and implemented appropriately. Moreover, empirical studies conducted with deductive methods (for example, see Anderson, 1971; Burnaska, 1976; Harrison, 1992) and with guided discovery (for example, see Craig, 1956; Kittle, 1957; Worthen, 1968) have confirmed that training objectives can be achieved through the use of either method.

Surprisingly, the findings did not confirm the hypotheses for supervisory problem-solving skill and facilitation of subordinate problem-solving skill. Two explanations for these findings seem most plausible. First, it is possible that trainees were not exposed to the guided discovery method for a sufficient period of time to influence their problem-solving behaviors. Joyce and Weil (1986) and Newbert and Binko (1992) suggest that while immediate improvements in problem-solving skill are not often found with the use of one particular method of instruction, the continual and repeated use of an inductive method will in all likelihood promote the development of problem-solving skill.

A second explanation for these findings is that certain organizational factors may not have supported the types of behaviors that individuals typically manifest during problem solving. One of these factors may have been the culture of the organization. Many supervisors in the study reported that a norm of this organization is that they are expected to solve problems on their own as quickly as possible. In all likelihood, this type of culture inhibits the use or development of problem-solving skill. Another organizational factor that may have influenced supervisor and subordinate problem solving was the goal orientation of the organization. Primary job challenges reported by supervisors involved managing people, projects, and tasks to meet productivity standards and/or target dates. Seemingly, this type of production goal orientation leaves little opportunity for using or facilitating problem-solving skill in the workplace. A third factor that may have influenced the problem-solving behaviors of supervisors and subordinates was the organization's incentive system. A review of the participant responses indicated that little to no incentive was provided by the organization to supervisors for developing their own problem-solving skill or facilitating its development in subordinates.

Surprisingly, while the findings showed that the two methods of training did not differentially impact acquisition of learning or problem-solving skill, they did show that supervisors in the deductive group were able to apply their learning to a greater degree than the guided discovery group. Three rationales may possibly explain these findings. First, differences in the sequence and purpose of the instructional events used in the two training methods may have influenced subjects' ability to apply their learning. In the deductive group, participants practiced the constructive feedback process in a role-play exercise and, afterward, applied the constructive feedback process to a job situation in an OJT activity. While trainees in the guided discovery group also participated in a role-play and an OJT activity, the sequence of the learning activities was reversed and the objective for both activities was concept formation rather than concept application. In contrast, guided discovery group members collected information about the constructive feedback process during the OJT activity, and then made and tested inferences about the steps in the constructive feedback process during the role-play activity. A comparison of these differences suggests that supervisors in the deductive group may have had greater opportunity to practice the constructive feedback process in its final form under conditions highly similar to actual job situations and, as a result, were able to apply their learning to a greater degree.

A second explanation for these findings is that the amount of time allotted for the OJT activity, six working days, may have differentially impacted the two groups. Unlike the deductive group, most supervisors in the guided discovery group had to schedule a meeting with another individual to complete the OJT activity. The limited amount of time may have prevented subjects in guided discovery group from thoroughly completing the activity and, as a consequence, diminished their ability to benefit fully from subsequent training activities and apply their learning to job situations.

A third explanation for these findings is that the nature of the method used to evaluate learning may not have fully reflected all of the learning which occurred. The CLRS was used to evaluate responses in terms of their demonstration of six pre-defined constructive feedback steps. While these steps were presented to the deductive group, the nature of the guided discovery method called for that group to induce the steps through their learning activities. A review of the transcripts and materials from the training sessions found that the guided discovery group created a five-step process; they had combined the six key steps identified in the instructional unit into two

steps and had added three other steps. After comparing the instructional unit's constructive feedback process and the one created by the guided discovery group, several constructive feedback experts commented that the latter process was actually more inclusive. Thus, it is possible that trainees in the guided discovery group learned a great deal, but were unable to demonstrate that learning because the assessment tool too rigidly measured learning according to a pre-defined process.

Paradoxically, while the findings showed that participants in the deductive group were able to apply their learning to a greater degree with no differences between the two groups on problem-solving skill, participants in the guided discovery group perceived that the quality of the training activities and the overall training experience was better than those in the deductive group. Different levels of trainee participation, which are inherent in the two training methods, may explain these findings. While supervisors in the deductive group passively received information during their training experience, those in the guided discovery group actively participated in most phases of their training experience. Learning outcomes that have been associated with high levels of trainee participation include greater motivation to learn, greater interest in the content of the lesson, and increased intrinsic satisfaction in learning (Newbert & Binko, 1992; Taba, 1966). Accordingly, it is possible that trainees in the guided discovery group enjoyed the high level of participation that they experienced during training and reflected this satisfaction in their attitude surveys.

In summary, it was found that while the deductive method resulted in greater application of learning, guided discovery was the training method that supervisors preferred. Furthermore, anecdotal data indicated that certain aspects of the training experience and of the organization mediated the ability of supervisors to participate in, learn from, and apply the skills acquired during training. However, several limitations of the study should be considered when generalizing its results. The sample was small in size (N = 16) and contained a fairly homogeneous group of supervisors. In addition, the treatment was embedded within a week-long supervisory training program and, although attempts were made to avoid overlap of training content, it is possible that the findings were influenced by the interaction of the treatment with the other instructional units of the training program. Accordingly, the generalizations of this study seem most appropriate for those populations which have predominantly new and inexperienced supervisors and those training programs which focus on developing basic supervisory skills. It is recognized that replications of this study with other samples and under different conditions are required to strengthen the validity of its generalizations.

Implications. Although this study did not confirm that an inductive training method effects the concurrent development of technical knowledge and cognitive skill, there are four important implications of the findings for theory, research, and practice in HRD. First, more must be known about guided discovery before it can effectively be used as a method of training. While the findings show that guided discovery was the method that trainees preferred, the evidence also shows that the deductive method enabled trainees to apply their learning to a greater degree. Perhaps further study of guided discovery with larger sample sizes and variations in some aspects of the method (for example, varying the amount of exposure to the training method and the amount of practice with the training content in its final form) would find significant differences in the development of technical knowledge and cognitive skill, all the while maintaining the high levels of trainee interest, motivation, and satisfaction that were found in this study.

Second, the findings indicate that supervisory training programs should cautiously continue to use deductive methods for training new supervisors. However, some evidence in the self-directed learning literature suggests that the desire and ability of trainees to participate in and learn from different methods of training may vary with their level of expertise (Grow, 1991; Pratt, 1988). For example, Gerald Grow (1991) in his Staged Self-Directed Learning Model matches the degree of directiveness of the trainer with the desire and ability of the trainee to be self-directing during the learning process. Correspondingly, it is plausible that more experienced supervisors may respond differently to the guided discovery method since they have greater knowledge, skills, and experience to utilize during the learning experience. Further investigation of the relationship between level of expertise and method of training is clearly warranted.

Third, the findings suggest that evaluation of training should include assessments of changes in job behaviors and job performance. Traditionally, HRD practitioners and researchers have relied on exit surveys and, to a lesser degree, measures of learning as the means for evaluating training programs (Werner, O'Leary-Kelly, Baldwin, & Wexley, 1994). The concern with these

methods of evaluation is not with their usefulness but with their completeness. The findings of this study showed that the attitudes of trainees toward training and their levels of learning immediately after training were not consistent with their subsequent job behaviors. If the results of this study had been solely based on the first two measures, the study's conclusions would have been markedly different. As this situation illustrates, the usefulness of different training methods would be better understood if the impact of those methods on job behaviors and job performance was evaluated.

A fourth implication of this study is that the influence of an evaluation method on the use of divergent and innovative thinking during training should be considered when designing training programs. As reported, the constructive feedback process created by the guided discovery group was different than, and in some ways superior to, the process defined in the instructional unit. Yet, the rating scale that was used to evaluate learning was based on the defined process. If organizations truly value creativity, innovation, and inductive thinking, it appears that more flexible methods of evaluation should be selected for training activities which involve the use of and/or result in the development of these types of higher-level cognitive skills.

Future Research. Four research questions appear central to deepening present understandings about the usefulness of inductive methods for training in organizational settings. One of these questions is: How do different groups of employees with varying levels of expertise respond to inductive training methods? Since this study focused on one group of employees, new supervisors, further examination of inductive methods with other groups of employees and differing levels of job expertise would expand current knowledge regarding the usefulness of inductive methods for training purposes.

A second important research question is: What is the role of certain aspects of the inductive method in terms of achieving training outcomes? Data in this study suggest that the level of trainee participation, the degree and type of practice with the training content, the amount of exposure to the training method, and the method of evaluation may influence the attainment of training outcomes. Further study of these variables is required to clarify their role in achieving specified training outcomes.

A third research question is: What types of training outcomes can be realized by using inductive training methods? Although numerous learning theorists have proposed that inductive methods result in greater acquisition and transfer of technical and cognitive skill than deductive methods, these propositions must be empirically investigated to examine their validity for adults involved in training activities.

A last research question that emerges from this study is: How do organizational factors influence the development and use of various types of higher-level cognitive skills? While there has been a fair amount of empirical study investigating the role of organizational factors in the transfer and development of technical knowledge and skill, much less is known about how these factors influence one's ability to develop and use different types of higher-level cognitive skills in the workplace. Considering that employees increasingly require higher-level cognitive skills to do their jobs, further study of how organizational factors influence the development and use of these skills is warranted.

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Identifying Instructional Criteria in Corporate Settings

Clark J. Hickman, Ed.D.
University of Missouri-St. Louis

A factor analysis study on responses from a national sample of 372 trainers who completed the Trainer Method Acceptance Scale ***provided empirical evidence of six conceptually distinct factors associated with the criteria corporate trainers employ when deciding to adopt or reject a proposed new instructional method. The results of this study suggest that those charged with trainer development may increase the likelihood of training-transfer if the rationale for changing instructional behavior aligns with criteria that trainers themselves consider important in making these decisions.***

According to McCullough (1987), most corporate trainers were themselves not trained to teach other people, either in an educational environment in general or a corporate classroom in particular. Moreover, corporate trainers naturally vary in training competence regardless of their formal preparation. McCullough, reporting for the American Society of Training and Development (ASTD), found that 98% of corporate trainers have at least one college degree; however, the rapid proliferation of technologies and teaching methods available to trainers makes it imperative that they continue their professional development. Another reason for the importance of professional development is the background of most trainers. In the survey conducted by ASTD (McCollough, 1987), only 24% of the trainers who responded indicated a background in education; the rest of the respondents became trainers after being managers, technical specialists, or salespeople. Such diverse backgrounds inevitably lead to variations in important competencies such as program planning, instructional methods, delivery techniques, training evaluation, and appropriate responses to the needs of adult learners (Henschke, 1991; McLagan, 1983, 1989).

Adult educators, for example, strongly favor specific methods that are considered appropriate for use in adult learning situations. Methods that involve learner participation in the planning of educational activities, respect for learners' backgrounds and needs, transformation of instructors from "know all" experts to facilitators of learning, and the instructor's true desire to help learners identify and self-direct their learning activities are all important considerations when working with adults in learning situations (Knowles, 1980). The practical applications of the emerging literature in the field of adult education suggest there are a variety of instructional method alternatives for trainers who deliver corporate training programs. Moreover, the field of educational psychology, using social learning/self-efficacy theories, gives further insight into the motivation and decision-making process of trainers. To those charged with the responsibility of providing professional development opportunities for corporate trainers, it would be useful to be able to anticipate and respond to the criteria *trainers* use when deciding to adopt or reject a proposed instructional method. To date, the fields of adult education, educational psychology, and corporate training have not empirically identified the criteria that trainers use to make these decisions.

Given the advances in technology as well as advances in our understanding of both adult learning theory and social learning/self-efficacy theory, professional development for corporate trainers is becoming increasingly critical. Yet, despite the enormous financial and human investments made in the field of corporate training, the training profession cannot

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identify, let alone predict or use to its advantage, those criteria that trainers themselves use in selecting instructional methods. The literature that does exist relative to "training trainers" often prescribes how training *should* be conducted, as opposed to analyzing the decision-making processes that trainers *actually* use in selecting methods. This gap in knowledge needs to be addressed so that professional development for trainers can occur in a fashion that enhances the likelihood that trainers will respond favorably to the development efforts used.

Theoretical Framework

Social Learning/Self-Efficacy Theory. Bandura's social learning theory, first proposed in 1977, explains human behavior in terms of cognitive, behavioral, and environmental components. It also explains human behavior in terms of reciprocal determinism, which stipulates a "reciprocal interaction between cognitive, behavioral, and environmental determinants" (Bandura, 1977a, p. 204). Unlike previous views that considered behavior a function of the person and the environment, reciprocal determinism emphasizes the mutually reciprocal roles of behavior, the person, and the environment on subsequent behavior. People are therefore neither "victims" of the environment, nor are they totally free agents to become whatever they choose (Bandura, 1986).

Using the social learning theory model, it was theorized that corporate trainers are markedly influenced in their decision to accept or reject a proposed instructional method by 1) their conceptions and beliefs regarding the innovation, including their personal preferences toward instructional methodologies; 2) the behavior required and self-perceptions of their ability to perform the innovation successfully; and 3) the anticipated environmental outcomes of performing the innovation. Examples of environmental outcomes that would obviously influence both cognitive and behavioral activities include anticipated support (or non-support) from peers and supervisors, effective instruction and/or modeling (or lack thereof) of the proper use of a proposed method, and expected learning outcomes.

Self-efficacy theory, a subpostulate of social learning theory, is also applicable here. Within the context of Bandura's social learning theory, behavior change is hypothesized to occur through cognitive processes that are mediated by experiences of mastery stemming from successful performance. Bandura distinguishes between "efficacy expectations" and "outcome expectations" as two distinct and primary (although not exclusive) determinants of behavior (Bandura, 1977a, 1977b, 1986). An "efficacy expectation" is defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977a, p. 79). An "outcome expectation" is defined as "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977a, p. 79).

It is Bandura's contention that levels of self-efficacy determine whether behavior change or coping strategies will be attempted or initiated, the amount of effort that will be expended, and the amount of time the effort will be sustained in the face of failures or other obstacles (Bandura, 1977b). Regarding the relevance of social learning/self-efficacy theory to educational thinking, Ashton (1985) found that a "teachers' sense of efficacy [is] a critical construct in explaining teaching motivation. It is expected to influence the teachers' choice of instructional activities, the amount of effort they expend in teaching, and the degree of persistence they maintain when confronted with difficulties" (p. 144).

Applications of self-efficacy and social learning theory are fairly new in the training profession. Consequently, only a few scientific studies have emerged that thoroughly explore the role of self-efficacy in explaining behavior change variance relative to a training program. Indeed, there is no empirical evidence that explains behavior change, from a self-efficacy

perspective, in the corporate training population (Gist, 1986). However, social learning/self-efficacy theory has been successfully applied in studies identifying the criteria used in selecting instructional methods in similar populations: elementary and secondary teachers (House, 1992); adult educators (Henschke & House, 1989); and community college faculty (Lindstrom , 1990).

Research Questions and Hypothesis

This research was conducted in two stages and constituted two separate studies. In the first stage, the actual criteria corporate trainers employ in the selection of instructional methods had to be identified. Therefore, the three research questions addressed:

1. Research Question 1. What criteria do trainers apply in the selection of instructional methods?
2. Research Question 2. With what relative frequencies do trainers evaluate the criteria?
3. Research Question 3. What demographic characteristics of trainers, if any, predict method selection criteria?

Given the answers to the first three research questions, an additional sample of the corporate training population was obtained to further study instructional method adoption criteria from a social learning/self-efficacy theory perspective. The criteria were divided into two factors, Intrinsic and Extrinsic Issues. The task was to determine if the corporate trainers used in the two samples applied common intrinsic and extrinsic criteria with equal frequency, and whether or not there were conceptual differences between corporate trainers and other teaching populations regarding intrinsic and extrinsic issues.

For the second stage of the study, the following hypothesis was tested: The criteria used by corporate trainers to evaluate potential methods of instruction are attributable to two factors as follows: ***Factor 1: Intrinsic Issues*** (Qualitative Trainee Outcomes, Trainer Enthusiasm, and Trainer Self-Efficacy) and ***Factor 2: Extrinsic Issues*** (Approval, Concept Versatility, Practicality of Implementation, and Quantitative Trainee Outcomes).

Methodology

The planning for the first part of the study occurred in three stages from October 1988 through March 1989. During the first stage, the *Method Acceptance Scale for Teachers* (House, 1988), which was used to identify instructional method adoption criteria in elementary and secondary teachers, was reviewed; wording was changed to reflect the particulars of the corporate training population. Additionally, items were added after consulting experts and the literature as to possible variables specific to the corporate training population. During the second stage, the instrument was piloted to 10 experts who were asked to complete the questionnaire and offer suggestions for clarity, additions, and deletions. During the third stage, the instrument was administered to 372 trainers. These 372 trainers represented 33 companies in 30 cities in 18 states. Two hundred ninety-seven (84%) respondents were full-time trainers, whereas 57 respondents (15%) were part time. Almost half of the respondents (179: 49%) had 1-5 years experience, but the mean number of years experience for the whole sample was 7.61 years (S.D. 6.93 years). The respondents were fairly evenly divided by gender: 217 (58.3%) males and 153 (41.1%) females.

The research instrument, renamed the *Trainer Method Acceptance Scale* (House & Hickman, 1989) had two parts. In Part One, respondents were asked how frequently they consider each item as they evaluate new approaches to instruction. Response options were "Never," "Rarely," "Sometimes," and "Often." Part Two asked for biographical data and was titled "About You." Respondents indicated whether or not they currently instruct trainees, and the level of their trainees in the organization; predominant content area taught; whether they were full or part time; their age, sex, and years of experience as a trainer; number of previous training positions held; highest degree earned; whether or not they trained in-house; how they perceived their training skills; previous training as a trainer; and the amount of enjoyment they got out of training.

The data were subjected to an exploratory, principal component factor analysis followed by varimax rotation. The initial analysis included all 72 items and required that extracted factors possess eigenvalues greater than one in magnitude. Thirty-six principal components met this criteria. A scree plot indicated, however, that between six and eight factors probably could be clearly differentiated. Rotated factor loadings revealed some ambiguity both for item factor assignments and latent trait meanings. Items were gradually eliminated to improve the clarity of item assignments and latent traits. The final factor solution included 42 of the original 72 items (58.3%) and identified six distinct factors (see Table 1).

In the second phase of the research, these six factors were analyzed with an additional sample of corporate trainers during the fall of 1992 (n=228). This time, the six distinct constructs (factors) identified in the original research were grouped into two factors, labelled Intrinsic and Extrinsic Issues in accordance with Bandura's (1986) social learning/self-efficacy theory. Moreover, the *TMAS* instrument was amended to incorporate specific measures of self-efficacy, and a seventh construct (named Trainer Self-Efficacy) was hypothesized to be an Intrinsic Issue. These data were analyzed by maximum likelihood confirmatory factor analysis, using the LISREL VI program.

The statistical analysis consisted of a goodness-of-fit comparison between a hypothetical model and a null model. To reject the null counterpart of the research hypothesis, two sets of standards were applied. The first set of standards was statistical. Significant (*alpha* = .05) positive *lambda* loadings were required and a significant incremental *Chi*-square value was required between the full and null model. The second set of standards was practical. The single practical index was a *delta* coefficient of greater than or equal to .90. This value would indicate that 90% of the total item variance was accounted for by the full model.

Results

During the first stage of the research, six conceptually distinct factors that corporate trainers use when deciding to select an instruction method were identified. Table 1 identifies these factors, their respective eigenvalues, and percents of variance.

Table 1

Factor Analysis of *Training Method Acceptance Scale*: Identified Factors with Eigenvalues >1

Factor	Eigenvalue	Percent Variance
Qualitative Trainee Outcomes (Will it increase trainee learning?)	8.18	18.6

Table 1 Continued

Factor	Eigenvalue	Percent Variance
Trainer Enthusiasm (Trainer motivation and willingness to try method)	4.14	9.4
Approval (Administration and/or peer sanction)	2.57	5.8
Concept Versatility (Can I use the method with many different curricular areas?)	1.87	4.2
Practicality of Implementation (Do I have necessary materials and guidance to try this new method?)	1.73	3.9
Quantitative Trainee Outcomes (Will there be measurable results in terms of trainee learning?)	1.52	3.4

On a scale of 1-4 (1=Never; 2=Rarely, 3=Sometimes, 4=Often), raw score means were calculated by factor and are identified in Table 2:

Table 2

Raw Score Means by Factor

Factor	Mean
Qualitative Trainee Outcomes	3.7
Practicality of Implementation	3.3
Trainer Enthusiasm	3.0
Concept Versatility	3.0
Quantitative Trainee Outcomes	2.8
Approval	2.7

No statistical tests are reported because the large sample size virtually ensures that each successive mean difference is significant. Although the sampling process for this research does not support firm generalizations, it is reasonable to hypothesize that, for many trainers, methods of instruction are most often selected because of trainer predictions of the effects these methods will have upon trainee affect and cognition. The second most frequent reason for selection is how practical the new method is perceived by the trainer to be, and the third most frequent reason for selection is a trainer's prediction of his or her own affective response in using the method.

In response to the third research question ("What demographic characteristics of trainers, if any, predict method selection criteria?"), stepwise multiple regressions of the six factors were performed on the 20 variables constituting trainer demographics. Table 3 reports those variables that were statistically related to the factors. While there appear to be a few *statistically* significant variables per factor, the *practical* significance is dubious in light of the low R-squares and correspondingly low percentage of variance explained.

Table 3

Multiple Regressions of Factors on Demographic Variables (only significant variable[s] cited)

FACTOR	VARIABLE(S)	*B*	*β*	*t*	*p*	Adj. R^2
Qualitative Trainee Outcomes	Educ. Level	.062	.234	4.2	<.000	.05
Trainer Enthusiasm	Gender	-.201	-.208	-3.7	<.000	
	Instruct trainees?	.290	.161	2.9	<.000	.06
Approval	Years Experience	-.014	-.167	-3.02	<.005	
	Employed by Same Co. as Trainees	.327	.156	2.8	<.05	
	Inst. 1st Level Sup.	-.185	-.141	-2.6	<.05	.07
Concept Versatility	Gender	-.150	-.149	-2.7	<.05	.04
Practicality of Implementation	# Previous Positions	.039	.128	2.26	<.05	.01
Quantitative Trainee Outcomes	Content Area	-.077	-.198	-3.56	<.000	
	Trainees are Members of Other Company	.310	.151	2.695	<.05	
	Full Time vs. Part Time	.264	.133	2.392	<.05	.06

Consequently, the multiple regressions suggest that the demographics tested are not important predictors; i.e., the population is homogeneous relative to the six factors. Since it would be unreasonable to assume that 372 trainers from 33 companies in 30 cities among 18 states all had similar education, background, and philosophies, these data suggest that trainers adopt similar criteria for adopting training methods *after* entering the profession.

The third research question pertained to the extent to which the factors could be reliably measured. Reliabilities (internal consistencies) for the six TMAS factors were estimated through Cronbach's alpha coefficients. Respectively, the values are: Qualitative Trainee Outcomes = .84; Trainer Enthusiasm = .80; Approval = .81; Concept Versatility = .69; Practicality of Implementation = .73; and Quantitative Trainee Outcomes = .64. Consistent with statistical expectations, there are direct relationships between the order in which factors were extracted, numbers of items constituting each factor, and the magnitudes of corresponding coefficients.

Coefficient magnitudes generally indicate, however, moderate to strong relationships between item and raw scores.

The second part of the study is generally considered to be more academic, than practical in nature. Hence, only the salient features will be discussed.

In accordance with Bandura's social learning/self-efficacy theory, it was hypothesized that the original six factors (plus one called Trainer Self-Efficacy) were actually constructs that constituted *two* factors--Intrinsic and Extrinsic Issues. This model was tested with a sample of 228 trainers representing 107 companies in 81 cities in 35 continental U.S. states. The response to variable ratio was 32.57:1, well above the 30:1 minimum desired (Hair, Anderson, & Tatham, 1987).

The TMAS instrument was also revised to delete unreliable items and incoherent factors. The final TMAS instrument consists of 44 items designed to assess the seven constructs. The items assessing each construct are arranged randomly throughout the TMAS instrument.

Construct Means, Standard Deviations, and Reliabilities. Construct scores for each subject were computed as the sums of corresponding item scores divided by the respective number of items. Therefore, the construct scores were expressed in the same units as item scores, i.e., using a scale of Never=1, Rarely=2, Sometimes=3, and Often=4. Table 4 outlines the construct means, standard deviations, and *alpha* reliabilities for the seven constructs identified in the TMAS.

Table 4
Construct Means, Standard Deviations, and Reliabilities

Construct	Factor	Mean	Standard Deviation	*Alpha* (Reliability)
Qualitative Trainee Outcomes	Intrinsic	3.8	0.30	.8328
Trainer Enthusiasm	Intrinsic	3.0	0.56	.8525
Trainer Self-Efficacy	Intrinsic	3.5	0.57	.7656
Approval	Extrinsic	2.8	0.58	.7838
Concept Versatility	Extrinsic	3.0	0.47	.6708
Practicality of Implementation	Extrinsic	3.4	0.43	.6249
Quantitative Trainee Outcomes	Extrinsic	2.8	0.72	.5903

The rather academic exercise of simplifying the model to two distinct factors (Intrinsic and Extrinsic Issues) comprised of the seven constructs listed above was not empirically confirmed using LISREL. This hypothetical model was tested against a null model with all *lambda* parameters set at zero. Two conditions needed to be met to confirm the hypothetical model. First, positive *lambda t*-values were required to be *statistically* significant at *alpha*=.05. Second, to achieve *practical* significance, the hypothetical model needed to achieve a goodness-of-fit *delta* value of ≥ .90 in comparison to the null model.

All *t*-values were positive, indicating positive *lambda* values, and exceeded the .05 statistical criterion. The incremental *chi*-square values exceeded the .05 statistical criterion. However, the goodness-of-fit *delta* value failed to achieve the *a priori* practical assessment criterion of ≥.90; therefore the hypothesized model was not confirmed.

Discussion

This study proposed to identify the constructs that corporate trainers consider important when deciding whether or not to actually try a new instructional method in their classrooms. Seven constructs have been found to be statistically significant to trainers when making methodological decisions. These results can have profound implications for those who are charged with the professional development of trainers. By suggesting instructional changes on the basis of a congruence between the beneficial aspects of the method with the trainer's own value system, chances of successful implementation increase.

In descending order of construct mean magnitude, the following constructs appear to have influence over trainers in their decision to adopt or reject an instructional innovation:

1.) *Qualitative Trainee Outcomes.* Questions almost always (Mean = 3.8) asked by trainers: Will the trainees enjoy it? Will it improve my trainees' productivity? Will it enhance transfer back to the job? Will it increase trainee interest in the topic? Will it improve their enthusiasm? Will it aid in trainee comprehension? Will it actively involve the trainees? Will it challenge them?

2.) *Trainer Self-Efficacy.* Questions that are "sometimes" to "almost always" (Mean=3.5) asked by trainers: Can I use the method skillfully? Can I use the method competently? Can I perform the technique?

3.) *Practicality of Implementation.* Questions that are "sometimes" to "almost always" (Mean=3.4) asked by trainers: Has it been successfully implemented elsewhere? Is competent help available if I need it? Do I have, or can I obtain, the necessary materials? Was it presented to me skillfully? Do I have sufficient information to try it?

4.) *Concept Versatility.* Questions "sometimes" (Mean=3.0) asked by trainers: Will it increase my opportunity to work with other trainers? Is it appropriate, or can I adapt it, to the learning styles of my trainees? Is one of my colleagues familiar with it also? Can it be used with various levels of personnel within the organization? Is it compatible with other training methods used? Can I use it in different content areas?

5.) *Trainer Enthusiasm.* Questions "sometimes" (Mean=3.0) asked by trainers: Will I enjoy using it? Will it renew, maintain, or increase my interest in instructing? Will I find trying it pleasant? Is it compatible with my teaching style? Will it satisfy my curiosity? Will it enhance my motivation to train? Can I learn the method easily? Will trying it invigorate me?

6.) *Approval.* Questions "sometimes" (Mean=2.8) asked by trainers: Will my colleagues become interested in it? Will my supervisor approve? Will it benefit my career? Will my peers approve? Will senior management approve? Will it positively affect my performance evaluation?

7.) *Quantitative Trainee Outcomes.* Questions "sometimes" (Mean=2.8) asked by trainers: Will it improve employees' performance appraisal ratings? Will it improve trainee competence on corporate promotion-related criteria? Will it enhance trainee corporate citizenship?

Moreover, it is discovered that demographic variables of trainers, such as age, content area taught, number of years as a trainer, education level, full-time vs. part-time, nor number of professional career-moves made, were not significant predictors of criteria used to try new instructional methods. This is consistent with the literature which suggests that professionals tend to adopt group-like viewpoints, philosophies, and identification fairly quickly into the job and the demographic variables listed are rarely statistically or practically significant in predicting professional attitudes.

Future research needs to further explore the role of a trainer's level of self-efficacy. Specially, we need to determine precisely how important, if at all, the construct of self-efficacy is in methodological decisions. We need to determine the extent to which trainers consciously

assess their level of self-efficacy regarding an instructional innovation. Do trainers readily dismiss suggestions and training regarding new methods if they suspect they cannot perform the method--and do they cognitively attribute their dismissal to their inability to perform it? Or, do trainers consciously assess their skill-level and remain open to self-efficacy building activities for methods that may otherwise have merit?

Another important area of research would be to determine similarities and differences between the criteria identified by American trainers and by trainers in other countries and cultures. This type of knowledge would be important when training trainers in other cultures, which is increasingly the case as Americans exchange technical information with Japanese, Russian, and Middle Eastern trainers.

Although this study failed to validate an ultimately-hypothesized two-factor structure, seven cognitive constructs were found to have statistical significance. Also, for the first time, self-efficacy was found to be an important construct with statistical significance, using items that had face validity. These seven constructs can serve as a basis for further research to refine our knowledge of the cognitive antecedents of trainers' methodological decisions. These avenues of research promise to increase our understanding of trainers and the criteria they employ when making methodological decisions.

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Exploring The Use Of Training Games

James J. Kirk & Hal Shoemaker
Western Carolina University

This investigation explored differences in the use of games by trainers in 82 companies. The results indicate that games are used for a variety of training and group process purposes. Trainers who spent a larger percentage of their training time on gaming activities tended to use games more often "to generate ideas/solutions" and trainers who learned to facilitate games solely through experience tended to use games more often to "introduce new concepts."

Many educators and trainers consider games an effective instructional strategy. By "games" trainers are typically referring to activities requiring participants to perform tasks, play assigned roles, follow ground rules, and/or strive to reach a designated goal. Learners frequently find games a desirable departure from traditional training lectures. The challenge games present often gets the heart racing, blood rushing, and adrenaline flowing. The result is a "natural high." Since the outcomes of games are usually in doubt, they have a tendency to captivate trainees' attention. A psychological need for closure makes people want to know how things are going to turn out (i.e., who will become the winners). Furthermore, because most games are played in the company of other individuals they also help satisfy the human need for social interaction.

To adequately prepare students for HRD practice it is important for professors to provide them an understanding of how training games are currently being used in the workplace. Therefore, the aim of this study sought answers to the following research questions: (1)Is there a significant difference in the instructional purposes for which training games are used by trainers? (2)Is there a significant difference in the group process purposes for which training games are used by trainers? (3)Is there a significant difference in the instructional purposes for which training games are used by trainers with respect to a trainer's age, gender, years of training experience, training specialty, source of training games, supervisor's views on the effectiveness of games, the percentage of training time a trainer spends on gaming activities, and how a trainer learned to facilitate games? and (4)Is there a significant difference in the group process purposes for which training games are used by trainers with respect to a trainer's age, gender, years of training experience, training specialty, source of training games, supervisor's views on the effectiveness of games, the percentage of training time a trainer spends on gaming activities, and how a trainer learned to facilitate games?

Related Literature

An early use of training games was to train military personnel (Tansey & Unwin, 1969). Chess was among the first games used for this purpose and led to other tactical games involving map maneuvers (Thomas, 1957). Near the end of the nineteenth century some military training games involved an elaborate set of rules and used charts to depict every conceivable roll of the dice. Other games involved more real-life situations using military personnel to play out various scenarios. The use of such gaming simulations grew to be a standard part of military training throughout the world (Tansey & Unwin, 1969).

During the early part of the 20th century, the growth of industry created a need for more training. Training typically came in two forms--on-the-job training and classroom instruction. Over time on-the-job training proved to be slow in delivery and restrictive in content. It was often difficult for workers to transfer back to the job site information presented in classroom lectures. Taking their cues from military trainers, trainers in business and industry began to see games as a means of dealing with the limitations of both on-the-job training and classroom instruction. In 1956 the American Management Association developed the "Top Management Decision Simulation" which became the first widely used business game in the United States (Tansey & Unwin, 1969).

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According to Thatcher (1990) organizations currently use games for a variety of training purposes (e.g., to teach envisioning, negotiations, and decision-making skills). Games are also used to develop entrepreneurial expertise (Prohask & Frank, 1990) and to help participants gain a sense of camaraderie (Gamson, 1994). Trainers have found that games can be an exciting and informative activity leading to both high cognitive and high emotional involvement in the subject matter at hand (Thatcher, 1990; MacCrimmon & Wehrung, 1984). Participants actually begin to act and feel like characters in a real life situation (Thatcher, 1990). They subsequently begin to make decisions very similarly to decisions they might actually make in real life (Prohaska & Frank, 1990).

While there is little doubt that games have gained acceptance as a viable training tool, their effectiveness as an instructional strategy appears less certain. Some researchers hold that games are neither more or less effective than other training methods (Boocock, 1994; Cherryholmes, 1966; Dukes, 1994; Pierfy, 1977). However, there is some evidence that games heighten participants' interest more than traditional instructional methods (Cherryholmes, 1966; & Pierfy, 1977). This heightened interest is sometimes attributed to the more active involvement of learners while participating in gaming activities (Petranek, Corey, & Black, 1992; & Coleman, 1980). Other research has found that games contribute to higher affective and behavioral learning compared to traditional instructional modes (Bredemeier & Greenblat, 1981) and better enable participants to fit information into a real life context (Coleman, 1980). The studies of Petranek, Corey, & Black (1992) and Foster, Lachman, & Mason (1988) have found games to be a more effective teaching tool in the understanding of human behavior.

Method

Two hundred fifty questionnaires along with cover letters were mailed to randomly selected trainers listed in ASTD's *Whose Who In Training & Development*. Eight-two usable surveys were returned giving the study a return rate of 33%. The questionnaire contained 23 questions (i.e., 13 multiple-choice, 4 rank-ordering, and 6 fill-in-the-blank type items). Questions inquired into trainers' ages, gender, training experience, training specialty, use of training games, and immediate supervisor's views on the effectiveness of games as a training strategy.

Prior to testing for statistical significance, descriptive statistics were generated for the variables investigated. Interval data such as age, years of training experience, and percentage of training time spent on gaming activities were converted to categorical data. A series of multiple group *Chi-Square* tests were subsequently performed to test for significant differences between expected and observed frequencies. $P \leq .05$ was used as the level for determining statistical significance.

Results

An examination of the descriptive statistics revealed that respondents were primarily female (68%) with a mean age of 38 years. On average they had spent 9 years in the training field. Twenty-eight percent reported a training specialization in management/supervisory training, 15% in technical training, 15% in human relations training, and 6% in career development. Seventy-six percent of the trainers claimed their immediate supervisors considered training games just as effective or more effective than other instructional/group process strategies.

Fifty-four percent of the respondents said that they learned to facilitate games solely through experience (i.e., without any coaching on the part of colleagues or the benefit of any classroom instruction). They reported spending 18% of their training time facilitating gaming activities. Fifty-eight percent of the games they used on a regular basis were created by the trainers themselves. Forty-two percent of the trainers said that they spend at least 15 minutes debriefing players at the end of each game.

The *Chi-Square* test employed to answer question one (i.e., Is there a significant difference in the instructional purposes for which training games are used by trainers?) revealed no significant differences in the ranking of five instructional purposes (reinforce previously covered information, teach new concepts, introduce new ideas, measure what participants have learned during training, and assess what trainees already know about a subject prior to training). Mean rankings for the five instructional purposes appear in Table One.

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Table One: Mean Rankings For Instructional Purposes
N=82

Mean Ranking	Purpose
2.354	Reinforce previously covered information.
2.378	Teach new concepts.
2.415	Introduce new ideas.
3.622	Measure what participants have learned during training.
3.804	Assess what trainees already know about a subject prior to training.

*Items ranked 1-5 with 1 = "your most frequent instructional purpose for using a game and 5 = "your least frequent instructional purpose for using a game."

The *Chi-Square* test employed to answer question two (i.e., Is there a significant difference in the group process purposes for which training games are used by trainers?) revealed no significant differences in the ranking of five group process purposes (generate ideas, break the ice, motivate participants, build rapport among group members, build group cohesion). Mean rankings for the five group process purposes are presented in Table Two.

Table Two: Mean Rankings For Group Process Purposes
N=82

Mean Ranking	Purpose
2.39	Generate ideas.
2.866	Break the ice.
2.89	Motivate participants.
3.024	Build rapport among group members.
3.451	Build group cohesion.

*Items ranked 1-5 with 1 = "your most frequent group process purpose for using a game" and 5 = "your least frequent group process purpose for using a game."

The *Chi-Square* test conducted to answer question three (i.e., Is there a significant difference in the instructional purposes for which training games are used by trainers with respect to age, gender, years of training experience, a trainer's specialty, a trainer's source of training games, the percent of training time a trainer spends on gaming activities, how a trainer learned to facilitate games, and a trainer's supervisor's views on the effectiveness of games?) revealed one significant difference. Trainers who learned to facilitate games solely through experience used games to introduce new concepts significantly more often than did trainers who learned to facilitate games through some on-the-job coaching or by attending classes. See Table Three below for ranking frequencies for using games to introduce new concepts (*Chi Square* =10.478; P = .0331).

Table Three: Ranking Frequencies For Using Games To Introduce New Concepts

Ranking	Learned To Facilitate Games Solely Though Experience	Learned To Facilitate Games Via On-The-Job Coaching & Attending Classes
Ranked #1	18	7
Ranked #2	8	13
Ranked #3	10	9
Ranked #4	2	7
Ranked #5	6	2

The *Chi-Square* test employed to answer question four (i.e., Is there a significant difference in the group process purposes for which training games are used by trainers with respect to age, gender, years of training experience, a trainer's specialty, a trainer's source of training games, the percent of training time a trainer spends on gaming activities, how a trainer learned to facilitate games, and a trainer's supervisor's views on the effectiveness of games?) also revealed one significant difference. Trainers who spent 25% or more of their training time facilitating gaming activities used games to generate idea/solutions significantly more often than trainers who spent 12% or less of their training time facilitating gaming activities. See

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Table Four below for ranking frequencies for using games to generate ideas/solutions (*Chi Square* = 12.526; P = .014).

Table Four: Ranking Frequencies For Using Games To Generate Ideas/Solutions N=82

Ranking	Trainers Spending 1-12% of Time	Trainers Spending 25% or More of Time
Ranked #1	8	14
Ranked #2	6	5
Ranked #3	9	3
Ranked #4	6	2
Ranked #5	8	0

Conclusions:

The major significance of the study is that it supports the notion that training games have become a very important part of training. Respondents reported that on average they spend 18% of their training time facilitating gaming activities. A second significance of the study is that it highlights the variety of purposes for which trainers currently use games. The lack of any significant differences found among the five instructional purposes for which training games were used suggests that the use of games may have expanded beyond some of the traditional uses such as to "teach new concepts" and to "reinforce previously covered material." Today trainers are just as likely to use a game to "pre- and post-test a learner's knowledge of subject matter content." The use of games for group process purposes also appears to have gone beyond such traditional uses as "breaking the ice" and "motivating trainees." Games are equally likely to be used for "generating ideas" and "building rapport among group members."

Two conclusions can be drawn from the statistical differences found in the study. First, the finding that trainers who spend a larger percentage of time on gaming activities tend to use games more often "to generate ideas/solutions" probably has something to do with the nature of the games they are facilitating. Games that are used in problem-posing and problem-solving may simply last longer than games used to break the ice or to motivate participants. A more frequent use of such time consuming games may drive up the overall amount of training time a trainer spends on gaming activities. The finding that trainers who learned to facilitate games solely through experience tend to use games significantly more often to "introduce new concepts" suggests that trainers who learned to facilitate games through less traditional means may be more apt to use games for less traditional purposes. It has been more customary for games to be used to "teach" or "reinforce" new concepts as opposed to "introducing" new concepts (Thatcher, 1990).

Implications:

The findings of the research have implications for HRD academes and trainers, as well as the creators of training games. The large portion of training time being taken up by gaming activities (approximately 18%) and the large percentage of trainers receiving no structured training of any kind on game facilitation (80%) suggests that there may be a need to offer more college courses on the theory and use of instructional games. In addition, the large amounts of time being spent on training games to achieve a wide range of purposes strongly suggest a need to more thoroughly research their effectiveness in achieving such purposes. As for trainers themselves, if they wish to use games for group problem solving (e.g., games intended to generate ideas and/or solutions) they may need to be prepared to devote a larger percentage of their overall training time for gaming activities. These types of games may require more time to facilitate. Finally, the current acceptance and use of games as a viable training tool is likely to afford creative writing opportunities for academes in a variety of disciplines. In addition to the games themselves, professors and trainers are likely to be in need of books that discuss both the theory and use of games. To date, this instructional strategy has received little attention by human resource developers.

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Structured On-the-Job Training: Domain and Factors

Jong Cheul Yang
POSCO Management Research Institute, Korea

In order to identify on-the-job training, this paper critiques previous definitions of structured on-the-job training (SOJT) and defines it based on the critiques. After discussing target clients of on-the-job training (OJT) and the realtionship between OJT and other training methods, a SOJT process model is provided. Fianlly, factors which should be considered before desinging a SOJT program are discussed.

There is an ancient proverb: Knowledge is a treasure but practice is the key to it. This emphasizes the importance of transferring knowledge into use. OJT has been recognized for its potential for high transferability compared with other training methods because of an identical or similar setting between work and training. Malcolm (1992), stating the results of a Honeywell study, found that "About 80 percent of all critical job skills [of managers] are acquired...on the job" (p. 58). OJT has been recognized as the most common form of training in businesses and industries (Lewick-Wallace & Jack, 1988). Carnevale and Gainer (1989) viewed on-the-job training as "the principal means by which technical, economic, strategic, and regulatory changes are gradually integrated into the workplace" (p. 15).

In spite of its pervasive use and criticality, there are serious concerns about OJT. Learning by doing is hit-or-miss training with no guarantee of what tasks a worker will learn (Connor, 1983). OJT has been regarded as cheap and easy training to implement without any planning (Goldstein, 1993). This kind of training may waste work resources. DeJong (1994), Jacobs (1992), and Rothwell (1990a & 1990b) emphasized the importance of structuring OJT, thus, differentiating it from unstructured OJT which is "haphazard, incomplete, and too disruptive in the workplace..." (Jacobs, 1992, p. 500).

Because of these problems, it is necessary to identify the domain of OJT before trying to structure it. The domain or the subject area of OJT can be identified through defining it, finding what steps it comprises, and specifying the relationship with off-job-training (OFFJT).

Definitions of SOJT

The importance of structuring or organizing OJT has been emphasized from several decades ago (Engel, 1958; Goldstein, 1993; Nadler, 1979). Engel (1958), cited by Kruger (1985, p. 11), defined OJT as "systematic learning through the actual performance of an occupation in the environment in which the job will be performed....a process of accomplishing the steps in the written training program, over a period of time, together with an evaluation of accomplishments and progress at noted intervals."

Jacobs has made an effort to identify SOJT's boundary. His definitions of SOJT changed several times during the last few years:

> "the one-to-one process of providing the knowledge and skills to perform a specific task within a job" (1992, p. 500);
>
> "the planned process of transferring expertise from experts to novices in the work setting" (1992, p. 2);
>
> "the planned process of developing task-level expertise by having an experienced employee train a novice employee at or near the actual work setting" (Jacobs & Jones, 1995).

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'One-to-one process' in the first definition implies that the trainee numbers should be limited to less four in most cases (Jacobs, 1992) because OJT includes close observation and guided practice. But Mikes & Sullivan's (1985) successful case study showed that the interaction among trainees and other staff's involvement in the communication channel with trainees is needed in an OJT program, depending on the task types and duration of the training. As Rothwell (1991) and Senge (1990) pointed to the importance of team learning, a whole work-unit may have to take an OJT program, especially when the tasks need interaction among the unit members.

In the second definition, the notion that expertise on a task is transferred from experts to novice is not appropriate considering adult learning theories. Often expertise in adult learning is self-generated by learners themselves with facilitation from their instructor. Trainees are not necessarily novices, especially when the training is designed to obtain context knowledge rather than to obtain subject matter expertise, for example, a newly hired school bus driver who might have been a commercial bus driver. What he or she needs is to become familiar with geographical features on the bus route and the characteristics of his or her passengers, students. Adult learners should be analyzed to determine their expertise obtained through previous experiences before attempts are made to train them.

SOJT does not have to be restricted task-level expertise which stated in the third definition. In Mikes and Sullivan's (1985) study, the OJT content was the bank assistant-manager's job intertwined with many individual tasks. Except for simple and repeated tasks, it is more important to understand how to relate individual tasks to each other in a project or job than to develop individual task expertise. Jacobs (1992) himself recognized that "some observers view the 'project' as the most appropriate unit of work analysis, as opposed to the task, which they believe does not represent the expectations of today's work-place" (p. 511).

Considering the above concerns, the present author defines SOJT as:

> Planned training to develop workers' level of procedural knowledge required in performing specific tasks/projects primarily through observation and practice on or near the job site guided by a expeienced line workers who has instructional competencies.

In this definition, the key words are 'planned training,' observation and guided practice, and procedural knowledge. Like other formal training methods, OJT should be planned considering work schedule, human resources, and so on. In the planning step, involvement of top management as well as the line manager and the training coordinator will promote the effectiveness and efficiency of the program (Sullivan & Miklas, 1985). Top management involvement includes establishing the organizational policy which guarantees ongoing company-wide support (i.e., rewarding and/or relieving work load for OJT practice).

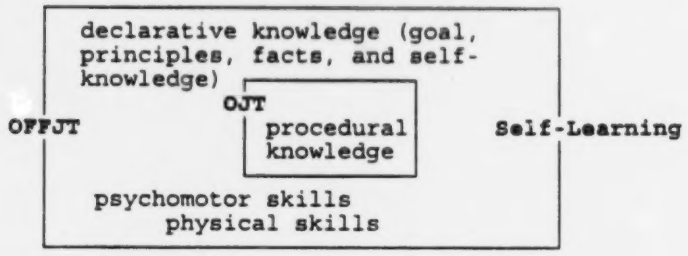
There is a Korean maxim which emphasizes the effectiveness of observation in learning: Hearing one hundred times is not as good as observing one time. But a trainer should be aware that his or her behaviors may be very automated and so fast that the trainee cannot follow it. The behaviors may not be able to be done without expertise obtained over a long time with repeated performance. The OJT trainer should know the key portions of learning theories and learner-centered instruction. In guided practice stage, OJT instructors should also supervise the trainees performance for the safety of people and equipment.

The concept of procedural knowledge is based on Anderson's (1985) cognitive model. Anderson divided knowledge into two levels: (a) declarative knowledge about facts and things, and (b) procedural knowledge about how to do something. For example, declarative knowledge about my car includes the fact (there are the gear stick, the brake and the accelerator in the control system) and description of how to change the speed. The procedural knowledge includes being able to change the speed actually. Anderson's (1987) interest was to find out that how procedural knowledge is developed from declarative knowledge and how it is turned into fast, accurate and flexible routines of high performance.

Besides these cognitive abilities, psychomotor skill is also needed in performing tasks. Declarative knowledge and psychomotor skills are primarily developed through off-job training and/or self-directed training. Procedural knowledge connects the declarative knowledge to the

behaviors according to the context cues in the work setting, thus, OJT is needed to develop procedural knowledge. Figure 1 relates appropriate training methods to the several components of competencies.

Figure 1. Components of Competencies and Training Method



Target Clients of OJT Most authors who have studied OJT have dealt with simple tasks performed by lower positioned production, lab or shop floor workers working with first-line supervisors (Connor, 1983, 1985; Kruger, 1985; Jacobs, 1987; Wichman, 1989). Several books on OJT have been written for line supervisors: On-the Job Training (Connor, 1983); One-to-One/Step-by-Step (Connor, 1988); and The Supervisor and On-the-Job Training (Broadwell, 1995).

However, considering that the purpose of OJT is to develop procedural knowledge and skills, it is unnecessary to restrict the target population of OJT to lower positioned workers. According to Malcolm (1992), most critical job skills of managers are acquired on the job. If that is true, there is a great need to develop SOJT programs for managers, even CEOs. If successors to CEOs who are going to retire are appointed prior to their retirement, SOJT can be used to help successors understand the whole company and its context cues to assist in carrying out management duty.

Relationship Between OJT and Other Training Methods Some authors (Mangum, 1985) compared the pros and cons of training methods according to the situation, demand, and constraints, primarily considering OJT with OFFJT dichotomously. This may be like comparing bread and butter, both of which have different functions and different dimensions and characteristics. OJT and OFFJT should be integrated to compensate for their weaknesses and to strengthen them. Without obtaining declarative knowledge thorugh OFFJT, OJT cannot be effective because trainees do not know what to do. Without OJT, the content knowledge cannot be applied with high trafer rate on the job. Rackham (1979) reported a case of sales training wherein 35 sales persons' performance was not improved after conventional classroom teaching. The problem was solved with a program designed where managers in the branch were taught methods for analyzing selling skills and systemically training their sales people on the job.

SOJT Steps Earlier, Engel (1958), Gold (1981), Stokes (1966), reviewed by Kruger (1985), emphasized the importance of structuring OJT for an efficient process and effective results. Kruger (1985) summarized the steps and specific actions of each step. The OJT steps include: prior to instruction, instruction, presentation, application and follow-up. Jacobs (1995) provided a OJT process model: decide whether to use SOJT, analyze the tasks to be learned, select, train, and manage the trainers, prepare training modules, deliver the SOJT, and evaluate and troubleshoot the SOJT. These models include similar steps even though they used different terminology.

The above models show the sequential procedure from selecting OJT as the training method to follow-up steps. Jacobs' OJT process model is a single loop. But the procedure does not have to be sequential. When the same or a similar program had been implemented before, the analysis step can be skipped or little adjusted. According to the formative evaluation, the order of steps can be switched or the same step can be repeated.

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The present author developed an instructional model consisting of six stages: analyze, design, develop, plan for implementation, deliver, and evaluate (Table 1). The personnel involved in each sub-step are included. Line experts are employees who have sufficient knowledge and skills to perform a specific job anywhere in the organization.

Some authors (Marquardt, 1976; Kruger, 1985) have pointed to a major problem in many informal OJT efforts: line experts, who are often charged with implementing OJT, are not prepared in instructional knowledge and skills. One possible response to this problem is to encourage subject matter experts who are responsible for OJT to take a train-the-trainer program specifically designed for OJT (Jacobs & Jones, 1995). Such a program would be strengthened if competencies needed by line experts for structured on-the-job training (SOJT) were identified, along with those competencies needed by human resource development professionals to support line experts who are doing SOJT. This model (Table 1) will be helpful to identify instructional competencies needed for performing each step.

Table 1

SOJT Steps and Personnel Involved

Step	Personnel
1. Analyze	
- specify organization goals	MN*
- determine training climate	TP**
- analyze the target tasks/task cluster and required knowledge, skills, and attitude for the performance.	TP LE***
- analyze trainee knowledge/skill levels, learning characteristics, and personality	TP, LE
- present training needs and goals to management for approval	TP, LE, MN
2. Design	
- set objectives	TP,
- determine sub-steps of delivery (explain, show, part practice, and whole practice)	TP, LE
- determine delivery media (job guide, CBT, video, one-to-one, etc.)	TP, LE
- determine evaluation methods (written test, performance check list, on-the-job performance)	TP, LE
3. Development	
- develop learning materials	TP, (LE)
- develop evaluation tools	TP, (LE)
- obtain feedback and revise	TP, LE
- pilot test and modify	TP, LE
4. Plan for Implementation	
- check the operation schedule	LE
- plan training schedule (number of trainees, number of trainers and staff personnel, tasks, condition, time, and equipment)	TP, LE
- set the criteria to select trainers, staffs, and trainers	TP, LE
- select candidates for OJT instructor and supporting staffs personnel, and trainees	TP, LE
- provide train-the-trainer programs for line experts	TP, LE

(Table 1 continued)

Step	Personnel
- arrange the workload of trainers supporting staff, personnel, and trainees	MN
- provide appropriate social and physical support	TP, LE MN
6. Delivery	
- place tools and learning materials at training site	TP, LE
- place trainees	TP, LE
- prepare learning place	LE
- deliver training according to design by explaining, showing, guiding practice from whole to part to whole	LE
- monitor the training process	TP, MN
- coach on dissatisfied parts of the trainees' performance	LE
6. Evaluate	
- evaluate the trainees' performance as planned	LE
- evaluate the trainer's instructional performance	TP, (MN)
- evaluate training materials	TP, LE
- evaluate training process	TP, LE
- document training record	TP, LE
- line manager/supervisors' evaluation on the job after training (one week, one month, six months...)	LE, MN TP
7. Follow-up	
- coach as needed	LE
- return to necessary earlier steps	LE, TP
- recognize trainees' completion of OJT (managers' congratulation, certification, promotion, or pay raise)	MN, TP, LE

* MN: management, ** TP: training professional, *** LE: line experts

Factors in Structuring OJT

Many authors (Jacobs, 1995; Gold, 1981; Kruger, 1985; Rothwell, 1991b) asserted that OJT should be structured, pointing out the negative results of unstructured OJT. But few of them provided empirical information on low effectiveness or harmful results of unstructured or informal OJT. Why should OJT be structured? Those authors used the terms are planned, organized, formal, and structured interchangeably. Although Rothwell (1991) used a term, "planned OJT" as equivalent to "structured OJT," the present author does not view that planned OJT is necessarily structured. An unstructured OJT program can be planned considering characteristics of the target tasks and economic value of the program. If a training program is more structured, more money will be spent in developing and managing the program (Figure 2). It is unwise to use training budget in formalizing training for few trainees to obtain expertise of simple tasks which are done infrequently.

Conceptually, structured training can be differentiated from unstructured training, but it should not be dichotomously judged: structured OJT is good, and unstructured one is bad. A more important issue is how much an OJT program should be structured, not if it should be

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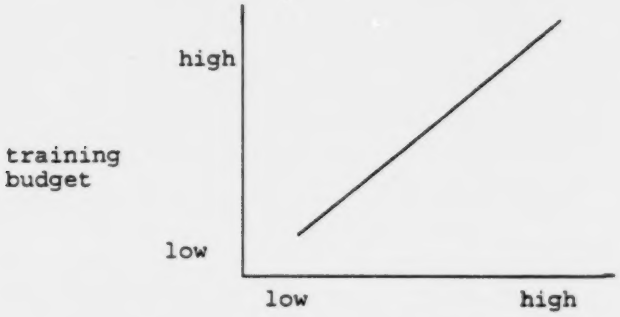
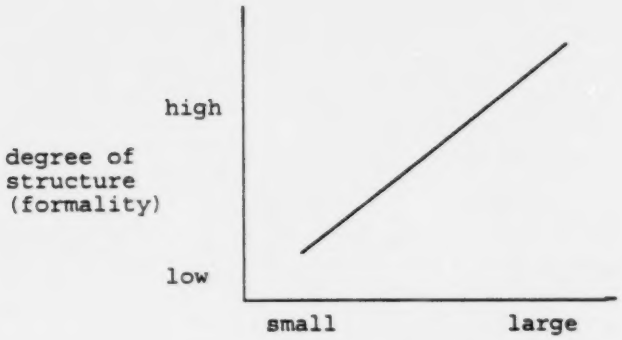
structure or unstructured. The issue is dependent on other variables: training unit (task, task group, project, or job), number of trainees (small or many), and stability of training content (changing or stable).

Figure 2. Degree of Structure and Training Budget



R. A. Swanson (personal communication, January 25, 1995) developed a three dimensional model: the Training Delivery Method Model. The three variables are number of trainees, content over time, and delivery method. Among them, the first and the second factors are related to the question of structuredness. The more trainees need training and the stable training content over time is, the more formalized training, such as off-site classroom training, is appropriate (Figure 3 & 4). If the number of trainees is small and the target content is changing, unstructured OJT is economic and appropriate.

Figure 3. Number of Trainees and Degree of Structure



Besides economic considerations, characteristics of the tasks are another criterion useful to judge the formality of training. If it is more important to know how individual tasks are to be inter-related rather than individual tasks themselves, the training should be provided in a task group or project as the training unit. Degree of structure correlates positively to size of training units (Figure 5). For some tasks, especially at executive management level, which are be intertwined in a complex way, informal explanation on the job will be more understandable and provide efficient learning. Instructional technologists should be aware of structuredness/formality issues before selecting or developing an OJT program.

Figure 4. Content over Time and Degree of Structure

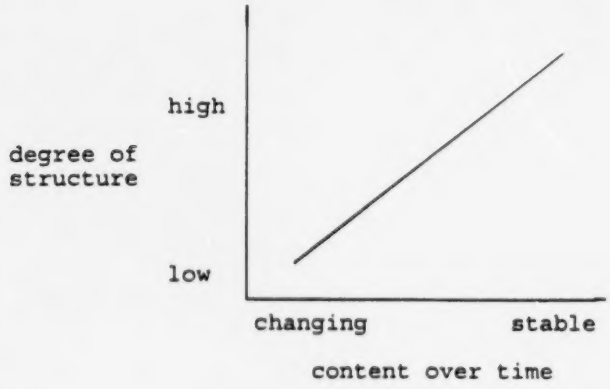
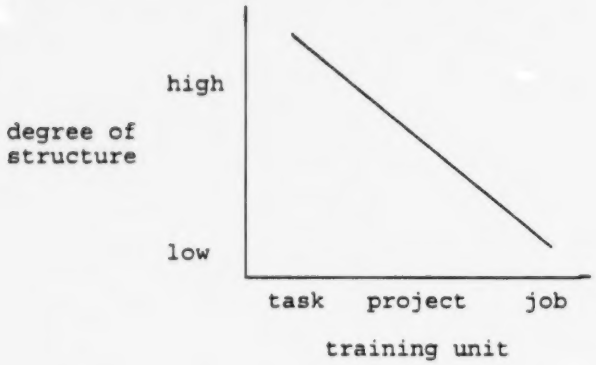


Figure 5. Training Unit and Degree of Structure



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